The **Challenge** of Technological Superiority

Alan Shaffer

For more than 25 years, the United States has had a dominant military advantage over any potential adversary. The underpinning of that advantage was the superior platforms and systems enabled by our technology. The technological superiority of the U.S. Department of Defense (DoD) is at the greatest risk in recent history, and this erosion occurs while ideological, economic, political, military and technological threasts proliferate to national and international security. Future engagements will require greater technological capability to operate in what I call the "commons": electronic warfare; missile defense; precision, navigation and timing; intelligence, surveillance and reconnaissance; integrated air defense; cyber; and weapons of mass destruction.

We are in a competition, and must do everything possible to get the best product from our research and development (R&D) program. Better Buying Power (BBP) 3.0 introduces initiatives to identify new investments, maximize output from our laboratories, increase our access to commercial and non-U.S. technology, enhance the linkage to industrial R&D (IRAD), and increase open systems to make modern technology more accessible. BBP 3.0 also is in direct support to the Defense Innovation Initiative (DII). Former Defense Secretary Chuck Hagel launched the DII with a goal of identifying new and innovative technologies that will be agile, flexible and ready to confront and defeat aggression from any adversary anytime, anywhere—with a smaller and leaner force structure.

The DoD has employed such "offset strategies" in the past to compensate for other challenges to national security. Our ability to obstruct, alter or move the playing field to take advantage of our strengths has given us the finest and strongest military capabilities in the world, to both protect and defend our nation and its allies and partners. The DoD is defining a new offset strategy to identify or devise new, high-payoff enabling technologies—unconstrained by current inventory—that will shape the trajectory of "technological superiority" and future materiel investments. The goal of this offset strategy is to create disruptive, enhanced and enduring operational advantages over potential adversaries at a time of constrained resources.

Research and Engineering (R&E) will play a pivotal role in addressing these current and future risks and the DoD R&E Enterprise is adapting to meet the challenge. Under the auspices of BBP—which recognizes that the DoD no longer has exclusive access to the most cutting-edge technology—the DoD R&E Enterprise seeks affordable innovation, reduced barriers to entry for non-traditional performers, and the application of critical thinking and new approaches to finding and developing new technologies, new capabilities and new advantages for our warfighters.

Defense Innovation Initiative

The DII was launched to harness the brightest minds inside and outside the DoD to identify current and emerging technologies, or projections of technology-enabled operational concepts. The goal is to accelerate the critical thinking, technical excellence and the business practices to support them that will allow us to improve our "speed to market" in the following areas: People, Wargaming,

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For decades, U.S. global power projection has relied on the ships, planes, submarines, bases, aircraft carriers, satellites, networks, and other advanced capabilities that comprise our military's unrivaled technological edge. **But today that superiority is being challenged in unprecedented ways.**

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Advanced military technologies, from rockets and drones to chemical and biological capabilities, have found their way into the arsenals of both non-state actors as well as previously less capable militaries. And other nations—among them Russia, China, Iran, and North Korea—have been **pursuing long-term, comprehensive military modernization programs to close the technology gap that has long existed** between them and the United States.

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A return to sequestration in fiscal year 2016 would affect all aspects of the department, but not all equally. More than one-third of the fiscal year 2016 cuts would come have to come from Operations and Maintenance accounts, with unavoidable reductions in readiness and our ability to shape world events in America's interest.

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Let me put this more plainly: Allowing sequestration to return would deprive our troops of what they need to accomplish their missions. Approximately half of the cuts would have to come from the department's modernization accounts, **undermining our efforts to secure technological superiority for U.S. forces in future conflicts.**

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Sequestration would put a hold on critical programs like our Aerospace Innovation Initiative, the Next Generation Adaptive Engine, the Ground-Based Interceptor missile defense kill vehicle redesign, and several space control efforts.

— **Secretary of Defense Ashton Carter**
Statement to the Senate Armed Services Committee,
March 3, 2015

DoD Research and Engineering Enterprise

- Military departments
- Service laboratories
- DoD Laboratories and Product Centers
- Defense agencies
  - — Defense Advanced Research Projects Agency
  - — Defense Threat Reduction Agency
  - — Missile Defense Agency
- Other federal government laboratories
- Federally Funded Research and Development Centers
- University-affiliated research centers
- United States and allied universities
- Allied and partner government laboratories
- Industrial base

New Operational Concepts, Business Practices, and a Long-Range Research and Development Program Plan (LRRDPP).

Long-Range Research and Development Program Plan

The LRRDPP is a focused, concentrated effort modeled on an effort in the 1970s when the LRRDPP gave the DoD stealth, Prompt Global Strike, precision munitions and night vision. We designed the current LRRDPP to reach across, and outside, the DoD Enterprise to examine new concepts, systems and technologies that could provide meaningful military advantage for the next 10 to 15 years. We are casting a wide net, encouraging new ideas from across the DoD R&E Enterprise (Components, Agencies, Federally Funded Research and Development Centers, Multidisciplinary University Research Initiatives, Universities, Labs, Industrial Base) and from non-traditional performers (small- to medium-sized businesses, entrepreneurs, academics, researchers, associations, think tanks—and the general public).

Many of the technologies the DoD will depend on in future will come from outside the DoD. Today, much of the newest and "coolest" technology is driven by the fast-paced and ever-evolving needs, appetites and volume of the commercial marketplace—not from a requirements system coupled to a structured acquisition process that moves slowly. Commercial technology turns over in 18 months in some sectors. The DoD needs to allow integration of fast moving sectors—BBP 3.0 addresses some of these. We need to attract, and hold, the attention and R&D focus of the commercial sector. The DoD needs to remove barriers to entry and speed time to market for the innovations it requires now and in the future. We must identify relatively mature technologies that can be applied in novel or unique ways; emerging technologies that can be rapidly matured to offer military capabilities; and non-defense technologies that can be repurposed to meet our emerging needs.

LRRDPP is helping us to expand our R&E Enterprise. We posted a Request for Proposals asking the R&E community, and beyond, to share with us its ideas; to help us think through the technologically enabled systems and architectures that will identify opportunities for enduring defense innovation. We want to know what we should be doing now to ensure these initiatives achieve maximum traction in our system, that institutional barriers are overcome, and that DoD rapidly integrates these new concepts and capabilities to improve its effectiveness.

We're looking for technologies that can be moved into development programs within the next five years. Those companies or individuals with ideas can submit them into the LRRDPP portal on the Defense Innovation Marketplace (see http://www.defenseinnovationmarketplace.mil/LRRDPP.html).

So far, more than 300 "ideas" have been submitted. Emerging themes surround the use of autonomy, range and quantities at cost (the disaggregation of complex systems into smaller, less expensive systems that can be flexibly combined and fielded in greater numbers).

The LRRDPP team consists of five small, AGILE teams of government technologists to identify critical technologies and drive materiel concepts with the potential to contribute to our technology offset strategy. The teams will consider all responses, and a report is scheduled in 2015, just in time to allow adjustments in the fiscal year 2017 budget submission.

Even as we drive toward "open" systems architectures—integrating commercial, university, laboratory and international researchers and research into our future programs—we must strengthen protections for unclassified Controlled Technical Information in both the government and industrial base. We must acknowledge that our research and production base will be expanding beyond our traditional performers in the future. This expanded use of commercial technology may require policy and regulatory changes.

We must scan the commercial sector to identify and capture emerging and disruptive technologies, and develop new tools to allow accelerated development, transition to, and incorporation by, the DoD. What new devices can we employ? Consortia, such as the Spectrum Consortia initiated in 2014? Social Media Tools? Market Research Centers of Excellence (MARCO)? Can we speed development and buy down risk through expanded use of pilots? Demonstrations? Prototyping? In short, BBP pilots the concepts to identify new technologies with high potential, addresses our outreach to all sectors of the technology enterprise, looks to enhance the application of IRAD and Small Business programs, and focuses on maintaining our technological superiority—a goal we all can support.

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